

Bell (J.)

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On Miasm x x

For David Dunglison

With the Author's respects

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Bell John



ART. VII. *On Miasm as an alleged Cause of Fevers.* By
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AS in the following essay I shall be led to form inferences, which are at variance with the creed of the medical profession at large, it is but just to them that I explain in advance the reasons which induce me to hold the opinions therein given, and thus exculpate myself from any charge of overweening desire at originality, by substituting, as is too often the case, paradox for patient investigation, and scholastic syllogisms for fair induction. I would fain steer clear of the two extremes pointed out by BACON. "*Duplex autem est excessus: Alter eorum, qui facile pronunciant, et scientias reddunt positivas et magistrales; Alter eorum, qui Acetalepsiam introduxerunt, et inquisitionem vagam sine termino.*" [Nov. Organ.] While I protest against the *facile pronunciare*, I by no means wish in this or any other question to encourage the *inquisitio vaga*.

In preparing materials for the course of lectures on the In-

stitutes of Medicine, which it is my province to deliver every summer, at "The *Medical Institute of Philadelphia*," I was necessarily induced to enter largely into the subject of ætiology, and especially of that branch of it derived from the knowledge of medical geography. To this study I was sufficiently prone, as well from my conviction of its utility, as from circumstances having at different times placed me in great varieties of climate both on sea and land. But it was not enough to echo the general and too seducing views of such writers as MONTESQUIEU and CABANIS, on the influence of climate as modifying national character, and tending to the formation of national laws. My object was to learn the precise effects of localities on the human frame, and to know how it was impressed by elevations of soil, exposure to particular winds, vicissitudes of temperature, moisture, and dryness. In this examination, if I except the treatise of HIPPOCRATES *de aquis aëre et locis*, I was without any sure guide. To embody then the notices of this nature scattered through travels and medical writers became my first task and duty. I commenced with the effects of the circumfusa, or all the evident and appreciable properties of the atmosphere; first considering them in their more simple state, applied alone and with intensity, as heat, cold, winds; and next observing their rapid succession and alternation, as in the several seasons, particularly spring and autumn.

Thus furnished with a series of valuable records and practical deductions, I next ventured on the subject of endemic diseases, in which I was of course required to investigate the reputed origin and mode of transmission of marsh miasmata or effluvia, or, as it is now more fashionably called, malaria. LIND, CLARK, JACKSON, BANCROFT, and JOHNSON, supplied me with copious details on this part of my course; and on their authority I ventured to present a summary of the generally accredited opinions upon this subject. I could not avoid, however, in the progress of inquiry, being forcibly impressed with the number of causes which modified, or in a great measure neutralized the power of miasm in the production of febrile diseases. The incipient doubts,

which now began to stagger my belief in the miasmatic doctrine, were by no means lessened when my views were extended to the study of epidemics. I found that the same fevers which are usually treated of as endemial, do not unfrequently become epidemical; and that this conversion or greater extension of such diseases was not pretended to be explained by an extrication of more miasm than usual, but by great irregularities in the seasons and abnormal vicissitudes in the weather. The perusal of GIANNINI on Fevers, an analytical notice of which is to be found in a former number of this Journal, gave me additional reasons for distrusting the fashionable theory: though the arguments of that writer in opposition to it partake too much of a speculative character. When, finally, I became acquainted with the valuable experiments and observations of the late Dr. WELLS on dew, and discovered that all the pretended laws of miasm were in fact the phenomena of dew, which latter we could accurately notice, while the separate existence of the former, or its independent action were never demonstrated, I could not hesitate to abandon my belief in a doctrine not supported by fair induction from observed facts, and which, moreover, evidently trammelled the judgment of the physician, both in investigating the causes of fevers and in the administration of his curative means. What is the process of reasoning adopted by the medico-metaphysical school of CULLEN and FORDYCE, and the gossiping one of FOTHERGILL and LETTSOM. Miasm—fevers of an intermittent type—bark and bitters. Thus at one cast we have cause, disease, and remedy, laid down with all the confidence that is asked for an axiom in mathematics, or a table of affinities in chemistry. Miasm working its way into the living body, and poisoning the springs of life, by the production of fever, until after a while it is arrested by the *Vis Medicatrix Naturæ*, and expelled by various outlets, or checked in its career by tonics and antiseptics, would form a good theme for the muse of BOILEAU or POPE; but ought not to have been taught in sober earnestness by a Scotch Professor. How admirably contrasted with this verbiage is the advice of Hippocrates. The man, says

he, who intends to practise physic in such a manner as not to be a reproach to his profession, must have a due regard to the seasons of the year, their different influences, and the several diseases they are capable of producing. He must, also, be well acquainted with the state of the winds peculiar to each country, and the qualities of the waters its inhabitants drink. He must carefully advert to the situations of towns, and the peculiar nature of the country in which they lie, accurately considering, for instance, whether it be *flat and hot, or mountainous and cold*. He must also reflect with what diet and regimen its inhabitants are principally delighted; whether, for example, they are addicted to drinking, gluttony, and idleness, or habituated to various exercises, accustomed to labour, and fonder of eating than drinking. Each of these circumstances is to be accurately investigated and discovered, since by a knowledge of these, the man who is even a stranger to a city or country may become acquainted with its particular nature, and so effectually discover the several diseases to which its inhabitants are subject, that he must be far more capable of prescribing for them than the man who does not sufficiently advert to these matters.

These are important and leading truths, which cannot be too forcibly impressed on our minds: for, unless we are aware of all the circumstances, which can possibly affect or modify the human frame, our practice, even though supported by Greek and Latin lore, and tricked out in all the pedantry of the schools, must necessarily be empirical.

The study of medical geography here assumes its due importance, and greatly facilitates the necessary classification of localities, in which endemics similar in their nature prevail. We shall find that the banks of the Ganges, the Nile, the Amazon, the Mississippi, the Danube, and the Po, though under such different latitudes, exhibit nearly the same grand outlines of endemial disease, subject to the modifications resulting from a higher or lower temperature, whereby, in the former case, fevers assume more of a continued form, with great gastric distress and hepatic determinations, and in the

latter are distinguished by more regular remissions and subsequent pulmonic complications.

But the type of fevers in these countries being more or less intermittent, does not, we think, imply the necessity of admitting miasm for their peculiar and specific cause. Cullen, however, in set terms tells us, that "the similarity of climate, season, and soil, in the different countries in which intermittents arise, and the similarity of the diseases, though arising in different regions, concur in proving that there is one common cause of these diseases, and that this is the marsh miasma."* A most singular method of argumentation truly! That since given and appreciable causes, (climate, season and soil,) always produce the same evident effects, (intermittents,) we are therefore to refer these latter to an unknown and inappreciable cause, (miasma.) Who does not see that with equal propriety we might admit some unknown principle as the common cause of pulmonic inflammations, because they are met with in similar climates, seasons, and soils, in different countries. To arrive at such a conclusion in either case, demands very different premises from those laid down, as every one must be sensible who gives a common and unit cause for a disease, as contagion for the small pox, which can, we argue, only proceed from this specific agent, because it is a disease met with under the most opposite circumstances of climate, season, and soil.

"The miasma, so universally the cause of fever, is that which arises from marshes or moist ground, acted upon by heat. So many observations have now been made with respect to this, in so many different regions of the earth, that there is neither any doubt of its being in general a cause of fevers, nor of its being universally the cause of intermittent fevers in all their different forms." [*First Lines*.

This general proposition has been enlarged, and attempted to be explained by many succeeding writers, whose opinions have been summed up by BANCROFT, himself a mias-

* *First Lines*, lxxxiv.

matist of no little zeal and industry. From him we learn that a humid soil abounding in vegetable remains, and acted on by heat, the range of which is from 45 to 100 degrees of Fahrenheit, is the most favourable for the extrication of miasmata. This process is said to go on very slowly, while the mercury continues below 45°, and to be checked when it goes beyond 100°. It is accompanied by an evolution of different gases, chiefly the hydrogen, carburetted hydrogen, and some carbonic gases. VOLTA found that by perforating marshy ground with a stick, gas was disengaged, which, on the approach of a candle, or ignited body, burned with a light bluish flame, and if the holes thus made were numerous, it spread over the surface of the soil. To these changes some have added the diminution of oxygen in the superjacent air; but repeated experiments made in different countries, do not by any means warrant this supposition. We know, on the contrary, that air over a marsh near Milan, contained as much and on some trials rather more oxygen, than that over a part of the ridge of the Grison Alps. To none of the above mentioned gases, nor to any known combination of them, has ever been conceded the property of causing fevers: nor have the minutest and most persevering inquiries, led to the detection and exposure by the senses, of miasm, as a separate principle and cause of fever.

The decomposition of certain plants, as of flax, hemp, and indigo, has, we are told, been productive of miasm and its alleged effects, periodical fevers. Wood decomposed has, on similar authority, been attended with equally alarming consequences.

The assumed origin of miasm as above given, is after all far from being proved by facts. Many persons have resided year after year in the vicinity, I might say on the borders of mill-ponds, which have had their margins in the state most favourable for the extrication of miasm, without their having at all suffered from fever. At times, indeed, we hear of much sickness in such situations, but we shall generally find that fever was at the same time epidemic over extensive districts of country, placed beyond the reach of the mill ponds. The

inhabitants of every Dutch house ought, from the above creed, to be attacked annually with intermittent fevers, since to each is attached a summer house, situated immediately over a small stagnant canal, covered with vegetable remains and exposed to the sun's rays. Here, hours, especially in the evening, are spent by the family, without the members of it being afflicted with disease. In Ireland, the inhabitants of the northern district, where the linen manufacture is chiefly carried on, steep their flax in bog holes and ditches, with the effect of causing a stench for a great distance around, but no fever follows in the train of such a process. Ferguson, in his Essay on Marsh Poison, adduces several facts of a similar nature, to show that miasm cannot emanate from vegetable putrefaction.

Let us examine the subject in another point of view. In northern latitudes, the inhabitants are usually exempt from periodical fever during the winter season, because, forsooth, the temperature of the air is too low to promote vegetable decomposition and putrefaction. But can this reason apply in countries, as in the West Indies and Africa, where the temperature in the coolest season is upwards of 70° Fahrenheit, a temperature most favourable we are told to the production of miasm and its consequences, remittent and intermittent fevers, and yet during this season there is comparative exemption from disease. In summer again, when the heat to which the surface of the soil in these countries is exposed, is often from 120° to 140°, F. we ought not, according to Bancroft, to have miasm evolved, especially when there is great dryness; but it is precisely under such a condition of the atmosphere, that diseases are often most violent and the mortality greatest.

If miasm be the sole, remote, or essential cause of remittent and intermittent fevers, we ought only to meet with them under such circumstances as are admitted to be required for the formation and extrication of this miasm. Now we know from indisputable evidence, that *these diseases have originated and prevailed extensively in argillaceous soils, where no vegetable putrefaction was going on, or at all*

*suspected.** So much importance did LINNÆUS attach to such a locality, that he wrote his inaugural essay, *Hypothesis nova de febrium intermittantium causâ*, to prove that periodical fevers originated in all those places where the soil abounds in clay, and only in such places. VON AENVANK, of Louvaine, has, in the same belief, endeavoured to account for the prevalence of these fevers in an argillaceous soil, by supposing it to possess the property of absorbing oxygen from the atmosphere, and thus impairing its purity. Eudiometrical experiments of HUMBOLDT, and observations of MOROZZI and ROUPE, are cited as corroborative of this theory, which is not after all sustained by later experience. The facts are, however, not the less cogent, and neither require nor admit the formation or presence of miasm.

Periodical fevers are met with in mountainous districts where the usually alleged sources of miasm are not seen.

In the interior of the West India Islands, at an elevation of five or six hundred feet above the level of the sea, amongst a series of mountainous ridges, not directly exposed to currents of exhalations from swampy and low grounds, the form of disease is sometimes intermittent, sometimes remittent or continued, more generally dysenteric or ulcerative,†

Fevers of great intensity make their attacks in the high, hilly, but thickly wooded parts, in the island of Ceylon.‡ On the same authority we learn that places in the island of Sicily, situated on some secondary mountains, lying on the side of the primitive ridge, are very sickly.

Intermitting fevers have prevailed with violence on dry sandy soils, as in Dutch Brabant, according to PRINGLE; and in a region of Peru, barren from the want of water, and yet nearly uninhabitable from the number of dysenteries and semi-tertians.—(Fordyce.)

Intermittents have been brought on by various crude ingesta,§ by cold,|| and by local irritation,¶ without the

* Chisholm—Medical Topography of the West India Islands.

† Jackson on Fevers.

‡ Johnson on Tropical Climates.

§ Frank. Senac. Rubini.

|| Alibert.

¶ Giannini.

persons thus suffering having been previously exposed to marsh effluvia.

Are we not, after a review of such facts, justifiable by the rules of right philosophy, in denying the correctness of the miasmatic doctrine, and considering as a mere chimera, that which is not formed with any regularity under the very circumstances laid down as appropriate to its evolution, and the absence of which under other conditions does not prevent its alleged characteristic effects from being frequently displayed.

Respect, however, is due to long established opinions, and it will still be but right, in a spirit of courtesy, to suppose that miasm may be formed in states of the soil and air different from those hitherto mentioned, and give rise to fevers of varying violence and malignity.

The epidemical sickness called Inemperies, at Sardinia, is represented as raging from June to September, and as most fatal when there has been a want of rain for four or five months.*

The air of St. Philip, a town on the western coast of Africa, is so unhealthy on account of the little rain that falls, that the Portuguese used to send their criminals there.†

Will it be affirmed, that in these cases the miasm was extricated in the drying up of the soil, and thereby produced the fever. Unfortunately for such an hypothesis we have the testimony of Jackson, in treating of the West India climate, to apprise us, that in a *dry, rocky and barren soil*, the form under which the endemic appears is usually continued, and if the dry weather be of long continuance, the character which it assumes is frequently malignant and fatal even among such as have been long resident in the country, and are considered as assimilated to the climate. And again, in speaking of Surinam, he tells us, that the rains are frequently excessive; sometimes they fail; the miseries of the colony are then great; mortality among man and beast enormous. "On the whole, says Ferguson,‡ it may be truly said that although

* Lind on Hot Climates.

† Maffei Sull' Aria, p. 62.

‡ On Marsh Poison.

excessive rains will evidently cause the acknowledged wholesome and unwholesome soils to change places for a time, in respect to health, a year of stunted vegetation, through dry seasons and uncommon drought, is infallibly a year of pestilence to the greater part of the West India Islands."

It is a favourite position with the believers in the miasmatic doctrine, that a very dry and hot season will cause disease, by an evaporation from ponds, swamps, and the borders of rivers, and that when the ground is flooded with rain, health will be restored to the inhabitants. The fever mentioned by Jackson, as occurring in a dry, rocky and barren soil, cannot, one would think, be well accounted for on this principle. But for fear that I should be accused of withholding suitable enigmas to be solved by our oracular miasmatisers, I will mention after Lind and others, that in Guinea during the six or eight months of continued heat, when every thing is eventually hard and dry, and but for the dews would be parched up, and the rivers are restricted to narrow channels, leaving a great part of their beds uncovered, and exposed to the rays of a burning sun, there is no disease. But when the rains begin to fall, the fevers are rife, and the mortality great.

It is very obvious that the origin of the endemic yellow fever, could not be explained on the common hypothesis of marsh effluvia. Hence we find Bancroft endeavouring to show, "that febrific exhalations are often emitted from soils and situations which have no resemblance to a marsh;"* and Ferguson, already quoted, while he considers "that putrefaction and the matter of disease are altogether distinct and independent elements; that the one travels beyond the other, without producing the smallest bad effect; and that however frequently they may be found in company, they have no necessary connexion," still avows his belief in marsh poison, which "cannot, (he thinks,) emanate from vegetable putrefaction," "but is found most virulent and abundant on the driest surfaces; often where vegetation never existed, nor *could* exist for the torrents, such as the deep and steep ra-

* Sequel, p. 254.

vine of a dried water-course, and that it is never found in savannahs or plains, that have been flooded in the rainy season, till their surface had been thoroughly exsiccated; vegetation burnt up, and its putrefaction rendered as impossible as the putrefaction of an Egyptian mummy." He thinks this said febrific miasma very certainly generated from the paucity of water where it has previously abounded, provided that paucity be short of actual dryness. To the production of this a high atmospherical temperature is indispensable. "It would," he adds, "be unphilosophical to suppose, that the marsh poison, because other distempers, such as dysentery, coexist with it, ever produces any disease but the specific one of which it is the acknowledged parent, varying, however, in form, and as a modification of effect from the same cause, from the common ague of the fens of Lincolnshire, through all the milder remittent types, up to the aggravated yellow fever, or malignant remittent of the West Indies; and that variation so certain and uniform, in proportion to the power of the remote exciting cause, that the varying types of fever might be measured almost to a certainty by the degrees of solar heat, as marked by the thermometer."

The reader is hardly prepared for such a conclusion, from the premises laid down by our author, and some of his brother miasmatisers might object to his considering heat as the remote exciting cause, (if such phraseology be admissible,) rather than miasm. But our business at present is with the first part of the proposition, which insists on the unity of cause—miasm, and sameness of effect—remittent and intermittent fevers, and a denial that dysentery or such like co-existing diseases are to form a link in the chain of causation. The reverse opinion would seem the more correct, since we find this disease prevailing at the same season, and in the same district of country with periodical fevers, and at times alternating with them, and even assuming their type.* These facts are of such general notoriety, as to have induced the

* Pringle, Cleghorn, Blane.

late Dr. Rush to speak "of the unity of bilious fevers and dysentery," and led the confirmed miasmatisists to insist on the latter having the same marsh origin as the former. The admission is in a manner unavoidable. But when we can show that the disease in question does frequently and avowedly originate from atmospherical vicissitudes and extremes, aided by the use of crude ingesta, and exhibits such a close propinquity to remittent and intermittent fevers, are we not justifiable in receiving the same common causes for the production of the latter as of the former, and consequently in overlooking or denying the necessary agency of marsh miasm in either. To a miasmatisist himself I will appeal for a confirmation of this view. "Of the *remote* causes I need say little. They are the same in all parts of the world, atmospherical vicissitudes. Perspiration and biliary secretion being in excess during the intense heat of the day, are so much the more easily checked by the damp chills of the night; and the consequences which ensue are clearly deducible from the principle I have stated. In short, the same general causes produce bilious fever, hepatitis, and dysentery. They are the three branches from the same stem, the organs principally affected occasioning the variety of aspect."* We prefer this language to that of Jackson, who, in treating of the West India climate and diseases, tells us, that "the action of the morbid cause, (endemic irritation,) instead of being what is commonly called febrile, is not unfrequently *dysenteric*, sometimes eruptive and ulcerative on *dry, bare, rocky* and *hilly positions near the sea coast, or in positions where water flows with a rapid course.*" Both these writers are in accordance with the others already cited, (and the list might be much swelled,) as to the general sameness of causes of fever and dysentery. But how can there be general sameness or close affinity, if a peculiar specific agent, miasm or endemic irritation, be essential to the production of the former, and not necessary to that of the latter. Will it be alleged that the features of fever are so distinctive and so character-

* Johnson on Tropical Climates, Part II. sec. ix. Dysentery.

istic as to force our belief in a specific cause. The argument we apprehend, if not stronger, will lose none of its force, if applied to the ætiology of dysentery. Indeed we must suppose that it was the somewhat peculiar nature of the symptoms in this disease, which induced physicians at one time to consider it as contagious.* The revolution of opinions respecting this malady, has finally brought us round to the earliest entertained and most natural belief. Ought we not, if we are inclined to use equal industry in observation, and independence in judging, to arrive at a similar conclusion in the study of the causes of periodical fevers.

As one of the numerous and troublesome family, bilious fever stands foremost in these United States. It is the gastric or bilious remittent of Jackson, and may, as we have already seen, prevail where no miasmatic origin can be detected. "This," says Johnson, "is the grand endemic, or rather epidemic, (*morbus regionalis*,) of hot climates; and although greatly allied in many of its symptoms, perhaps generally combined with the marsh remittent already described, yet it occurs in various places, both at sea and on shore, where paludal effluvia cannot be suspected." This is but confirmatory of what is held by this gentleman when speaking of dysentery: and yet both are by him couched under the head of "specific diseases," for what reason we are at a loss to discover.

The yellow fever is now very generally considered as the product of miasm, but whether of a more subtle and malignant kind, or of increased activity by the high accompanying temperature, is a point on which writers are not well agreed. One thing, however, connected with this question, seems to be pretty generally admitted, both by contagionists and miasmaticists, viz. that this fever may be caused by heat as a predisponent, and any imprudence in regimen as an exciter.

Among the physicians of the first class, Sir GILBERT BLANE

* "And upon the whole it is probable, that a specific contagion is to be considered as always the remote cause of this disease," (dysentery.) *Cullen, First Lines*.

is no minor authority. In his letter to Mr. RUFUS KING, then Ambassador at the court of St. James, I find the following. "After laying together and considering fully all the facts relating to this subject, it appears to me that the yellow fever cannot be produced but in a season or climate in which the heat of the atmosphere is pretty uniformly, for a length of time, above the eightieth degree of Fahrenheit's thermometer; that under the influence of this heat, Europeans newly arrived, and more especially in circumstances of intemperance or fatigue in the sun, may be subject to it in many instances, but that it has usually become general only by the previous influence of that infection which produces the jail, hospital, or ship's fever, or from the influence of putrid exhalations; and that when so produced it continues itself by infection."

Most cis-atlantic physicians are disbelievers in the doctrine of infection as here laid down, and would prefer accrediting the effects of heat as above given. These effects are further evidenced by the facts detailed in the work of this author on the Diseases of Seamen, in which, after speaking of that sudden and fatal affection called the *coup de soleil*, produced by the direct rays of the sun, and the tendency of this heat when associated with fatigue and intemperance to bring on the fatal diseases of newly arrived Europeans in the West Indies, he adds:—"This has been remarkably conspicuous in the years 1794 and 1795, during which the most deplorable ravage ever known was made in the great armaments sent to the West Indies, yet the prisoners of war remained exempt from it, according to the testimony of those who had the custody of them at Jamaica and Antigua. There can be no doubt that the peculiarity of situation to which this is principally imputable is shelter from the sun," p. 203, London, 1803. It is pleasant to observe the records of an observing mind, given thus explicitly, at variance with the spirit of system and closet abstraction, and of his own theory. Did it occur to Sir Gilbert that the above facts are among the strongest that could be furnished in opposition to his notion of yellow fever becoming general "by the previous influence of that

infection which produces the jail, hospital, or ship fever,"—since the prisoners above alluded to must have been much exposed to this influence, whether they were confined on board a ship, or in durance on shore. Will "the influence of putrid exhalations," or of miasma afford any better solution? Not until it be proved that prison-ships and prisons are more favourably situated than ships in actual service or barracks.

Let us next hear the sentiments of the miasmatists on this head. "I am far from presuming to deny, says Dr. Ferguson, that there are fevers from pure excitement; for soldiers and others have been attacked and died of yellow fever, before they landed in the West Indies, or could be exposed to the influence of land miasmata in any shape." As this writer is neither ignorant of, nor inclined to disavow the occasional origin of fever from impure air, generated in the holds of ships, we may presume no such cause was present in the above-mentioned instances. MOSELEY was, we know, of the opinion that the yellow fever was a calenture or disease the offspring of heat. DICKSON, in his valuable essay on this disease, declares, after much experience of its origin and nature, that marshy effluvia or similar impure emanations, in other situations, are a great source of yellow fever. "But whatever may be the peculiar coincidence of circumstances or modification of cause, most fertile in the generation of yellow fever, an uniformly high temperature is the *causa sine qua non*. This is literally and eminently entitled to be so denominated, because it indispensably precedes the effect." And in another place. "The general healthiness of the West Indies, as well as of particular islands, varies considerably in different years, and at different periods. It is liable to be affected by certain states of the air, as unusually wet, or dry, or close, or otherwise unseasonable weather for the time of the year, by calms, by variations, (especially to the southward,) from the usual trade winds, and in the quantity of the electric fluid, and in certain years by what has been termed "an epidemical constitution of the atmosphere."

The island of Barbadoes is clear of wood, the land is moderately raised above the level of the sea, and every spot is

cultivated; there are but few swamps, and those are inconsiderable, and some rivulets only occasionally swelled by rains.* Notwithstanding this, yellow fever is, according to Jackson, more common in the hospitals of Barbadoes than in any other of the British islands. Be it remembered, however, that Bridgetown, the capital, and its vicinity are extremely hot from June to November: the thermometer, at noon varying from eighty-four to ninety degrees of Fahrenheit in the shade. What follows is not susceptible of ready explanation by the miasmatic theory. "The parallel of health, says Dr. M'ARTHUR, between the army and navy is worthy of notice. The fever for some preceding years has appeared in both about the same time, and attacked men of similar habits; but has in general been more aggravated on shore than at sea, or even on board the ships lying in Carlisle Bay." The causes of the malady are by him considered as a peculiar habit, consisting, in a disposition in the European constitution, to take on inflammatory action. "This disposition is excited into action by a variety of causes, the chief of which are intemperance, excessive fatigue in the sun, perspiration checked by being exposed to a current of air, or sleeping exposed to the dews, costiveness, &c."†

Mr. Dickinson, whose ample experience as a Staff Surgeon in the West Indies, entitles him to be heard with respect on this question, gives the following as the causes. "The predisposition consists in an inflammatory diathesis—an aptitude to diseases of general increased excitement; this appears sufficiently manifest by a consideration of the subjects, (strangers from temperate regions,) already stated as exclusively liable to its attacks. The exciting cause is an exposure to solar radiation, while unaccustomed to its influence, and unprepared to resist the force of its impression by the adoption of preventive measures. The effect of heat is liable to augmentation, if accompanied by violent exercise, by full living, and intoxication."‡

* Account of the Causus, or Yellow Fever of the West Indies. By Dr. M'Arthur, M. D. &c.

† Johnson on Tropical Climates.

VOL. II.—NEW SERIES.

‡ Johnson, Op. Cit.

No. 4.

The prevalence of a particular wind, whether it blow over land or ocean, will often give additional force to solar heat, and prove a powerful contributing cause of fever. Sometimes this effect is dependent on peculiar properties of the wind, sometimes on its imperfect power of perfusion, and thereby giving rise indirectly to a stagnant or stationary atmosphere.

LEFORT advances, with some confidence, his belief, that yellow fever need not be apprehended in some of the West India Islands, unless the winds from the southward have prevailed sometime previously. And BANCROFT in his inquiry into the epidemic of Gibraltar, in 1804, suggests, as "obvious and prominent causes, the accumulation of decomposable matters within the town, *and the long prevalence of a dry and scorching east wind*, which produced a very high atmospheric temperature, without any salutary ventilation of the place, as it was completely obstructed in its course by the high mountain behind the town, *in and over* which the air was for many weeks nearly stagnant. A similar dry and scorching east wind, blowing with too little force to change and purify the atmosphere, has invariably preceded and accompanied every recurrence of the yellow fever at Cadiz and other cities of Spain; and its effects in the year 1804 were very extensive and remarkable." FELLOWES, TOWNSEND, and BURNET, bear testimony to this fact; and, it is added, that at Cadiz, easterly winds, which generally preceded epidemics, occasion very distressing feelings even when their effects do not amount to disease.

I am really unable to discover the advances we make in philosophical induction by denying the direct agency of heat and stagnant atmosphere in the production of disease, and insisting in preference on the evolution of miasmata in these circumstances. To select as a cause that which cannot be detected or appreciated in any other way than by alleging certain well known phenomena as its effects, is not a novel process in scholastic argumentation; but ought not to obtain much favour at the present day, when mysticism has ceased to be in vogue, or to have any power over the sciences and liberal arts. That epilepsy and insanity are penalties incur-

red by guilt, and dispensations of wrath from the Maker to the creature, is an opinion occasionally advanced by those who are expounders of sacred writ, and one which we may at times be compelled to hear with deference, though we cannot yield it conviction. But, that there is such a thing as miasma, or malaria, as a substantive cause of fever, is one of those transmitted dogmas, which has not even the venerable support of the old man of Cos, nor of those who from time to time have become classical by following in his steps. Homer himself, with all his machinery of supernal powers, presents us with no being of such equivocal origin as this, which can only be compared to another poetical creation, Death that at birth—

“Forth issued, brandishing his fatal dart

“Made to destroy.”

Or more aptly it may be supposed from chaos sprung, and to chance, “high arbiter,” submissive.

This eagerness to reduce the many operative agents to one principle, which is to explain all the phenomena of the subject or the science, is not confined to medicine alone. Sensation and association for the metaphysicians—phlogiston at one time and oxygen at another for the chemists, have been found equally as pliable causes of the operations of mind, in the first case, and of the changes of matter, in the second, as *putrid ferment*, *anima medica*, *vis medicatrix*, *vital principle*, *contagion*, and last, though not least, *miasm*, to account for the production of diseases, or protection from their influence. All these baseless fabrics vanish before the fixed look of scrutiny, or if the mental vision occasionally tolerate their presence, it ought to be in one of those fits of voluntary illusion in which the imagination at times loves to sport, and for a while gives “to airy nothings a local habitation and a name.”

The reader, whatever may have been his previous prepossessions or prejudices, will, I trust, have seen in the facts and arguments already given wherewithal to destroy, or, at least, greatly diminish, his faith in the doctrine of miasm. The more fully to complete this object, I will now give with consistent brevity a sketch of the effects on the human body of the cir-

cumfusa. Some apology might be due for adopting this course, if a knowledge of all the physical agents by which we are surrounded, and by which we live, and through which we so generally become diseased, were made, as they ought to be, a branch of elementary study, and the basis of ætiology.

Of Heat. Solar heat acts primarily on the skin, and by means of the air on the mucous surface of the lungs; and like every stimulant applied to these surfaces, excites the nervous and capillary expansion, and subsequently the brain, heart and arteries. There is increased cerebral activity and hurried circulation, both of which are moderated by the coming on of perspiration. If the heat be long continued, the evaporation is disproportionately rapid for the supply of fluid from the secretory vessels of the skin, which is affected with dryness and redness, followed by induration and thickening, and after a time it assumes a brownish yellow colour.*

So far the effects are nearly physiological, and the person may become gradually inured to heat, without any great inconvenience or suffering; but its prolonged and more concentrated application is apt to bring on a diseased or pathological state, evinced by a parched and dry skin, *a burning sensation at the stomach*,† hurried respiration, and finally, (as sometimes occurs in the great desert of Africa, during the prevalence of the Semoom or Samiel wind,) asphyxia, hæmorrhage from the nose and lungs, and death.‡ The more chronic state caused by heat, shows itself in loss of appetite, faintness, nausea, deficient and irregular secretion from the mucous surfaces, and phlogosis of these membranes, hence the heat and tenderness of the stomach and intestines, and the parched and furred tongue. The liver, like all other glands, is obedient to the stimulation of the mucous surface, on which its duct opens, and secretes bile in increased quantity, which fluid aids in bringing on the succeeding phenomena of vomiting, diarrhœa, and griping pains. Like other glands also, it sympathises, or takes on synchronous morbid action with its corresponding surface, and hence its secretion is a

* Blumenbach, p. 110.

† Travels of Ali Bey.

‡ Volney.

fluid imperfectly elaborated, an irritant to the gastro-enteric surface, already irritated and prone to inflammation. It is needless now to inquire, whether this irregularity in the hepatic system, result from direct sympathy with the skin, or mediately with it by means of the intestinal surface. In either case heat is the exciting cause. On occasions, and those of no unfrequent occurrence, it will act as a predisponent, by keeping up such irritability as to render the external and internal surfaces liable to be readily affected by other circumfusa or various ingesta.

If the skin be exposed to the prolonged irritation of heat, eruptions, such as urticaria, pustules, scabs, leprosy, and *pellagra* supervene.

Heat and light combined, are a common cause of ophthalmia in warm climates, as in Egypt and Syria, where animals are subject to this disease; also in other parts of Africa and Asia, and southern Europe, particularly where sand and white rocks reflect the sun's rays. A complaint is described by PROSPER ALPINUS, which he attributes to the heat of the Egyptian climate. It is marked by excessive thirst, not always accompanied by fever, and often occurring in the midst of perfect health: the repeated fainting fits in it would soon terminate life, unless water were supplied to the full wish of the sufferer. If this be wanting, the patient dies in a swoon, or falls into a hectic fever. But as this malady may be attributed by some ingenious mystics to miasm, I shall next notice one, avowedly the direct consequence of undue exposure to intense solar heat. Its names are various—Insolation, *Ictus Solis*, *Seiriasis*, *Coup de Soleil*, Sun Stroke, &c.

The more moderate grade of this disease is evinced in the delicate inhabitants of a city, who have been long shut up in their apartments, and are, on the approach of spring, exposed to the sun. They suffer then from general headache, or acute pains in the forehead and temples, redness and dryness of the face and eyes, dry heat of the skin, somnolency or anxiety which prevents from sleeping, and sometimes distinctly marked fever. But sun strokes are much more dangerous in summer, at which season labourers in the field, ma-

sons, tilers, and others, who work out of doors, soldiers who make long and painful marches exposed to the solar rays, are the greatest sufferers. The greatest mortality on record from this cause, is that which occurred in Pekin in the year 1743. Eleven thousand persons fell dead in the streets from the insufferable heat, between the 14th and 25th of July. The effects of insolation are acute pain in the head, the vessels of which are gorged with blood; the eyes are very red and watery; the pulse hard, quick, and irregular; spasmodic and other convulsive movements and bilious vomiting supervene; the urine is suppressed. At other times the head is swelled in an extraordinary degree and covered with erysipelas; the subject falls into paralysis or subsultus tendinum, and the disease has a rapid termination. Chronic cephalalgia, maniacal delirium, and fatal phrenitis, are occasionally the distinguishing traits.

Examinations after death show the cerebral vessels much enlarged and gorged with blood; at times there is an extravasation of this fluid in the cerebral cavities, and at others no trace of disease perceptible.

The belief in the pernicious effects of exposure to the sun's rays, will perhaps account for the narrowness of the streets, so general in all the cities of southern Europe. We learn the importance which the Romans attached to this agency, from a passage of Tacitus, where he attributes the unhealthiness of Rome, after the great fire of Nero, to the streets being wider on the rebuilding of the city, and consequently not affording the same shelter as formerly from the sun's rays.

The direct and immediate effects of heat are increased by a dry atmosphere, while the predisposition to disease, and ready liability to be acted on by common and morbid causes, are greatest in a hot and moist air.

"It is remarkable," says Pringle, "that pestilential diseases have frequently occurred in dry and hot summers; and agreeable to this I have observed that the most sickly seasons have been attended with the greatest heat and the least rain." He quotes BARTHOLINUS's account of the fever at Copenhagen in 1652, which began in autumn, after an unusually hot

and dry summer, and which, in its symptoms and seat, was similar to our yellow fever. The stomach and duodenum were always inflamed or mortified, and Bartholinus hence concluded that these parts are the seat of all malignant fevers.*

I have already given the experience of Jackson, as to the great mortality during dry weather, and in a dry, rocky and barren soil.

The great number of deaths in our large cities during the intense dry heat of last summer, needs but to be alluded to on this occasion. We may be told that it was not fever which produced this result, though I cannot really see what consolation the friends of individuals who were carried off would derive, by being told that death was caused by insolation and not miasma—or by intense heat and cold water, rather than by miasm and wine or brandy. To me, thirty or forty persons carried off in the course of a week, some exhibiting all the marks of apoplexy or congestion, and effusion in the brain, and others of a violent spasm or colic, and inflammation of the stomach and bowels, evinced the operation of causes, to the full as potent as five, eight, or ten deaths in the same time by yellow fever, the alleged product of miasm. Is the suddenness of the event, and the uncommonly acute character of the first mentioned cases, proceeding from well known causes, a sufficient reason for overlooking them in the study of ætiology, merely that we may dwell with complacency on the latter, more regular in their course, and therefore to be referred to some unknown agency?

During the last summer, I was called in the morning to visit a man in Little Water street, near South, whom I found in all the horrors of cerebral congestion and convulsions. In an hour afterwards he was a corpse. He had retired to rest the preceding night after a supper of mush and milk, and a pediluvium of cold water: and it was not before early morn

* Here was a hint for Broussais, rather more significative than many expressions of Baglivi, to whom the French reformer is said to be so largely indebted.

that he awoke persons in the room beneath him by delirious efforts, as if he wished to bail out a boat. He was a fisherman, and of intemperate habits: he had been much exposed to the sun during the preceding week, and had on two different occasions suffered from a sun stroke. His mind had been troubled some time previously by domestic grievances. His habit of body was full and muscular. On examination, the brain was found to be the part chiefly diseased. The arachnoid membrane was thickened and covered with fluid, which also filled the ventricles. The pia mater was injected in patches, and its larger vessels turgid. The stomach and small intestines were deeply injected in different parts, and the liver much enlarged. Shall we admit as causes of disease and death in this case, insolation, intemperance, and mental anxiety. Are they not, by the showing of any side, causes of sufficient power, and adequate to the production of the above marked symptoms and appearances on dissection.

A week after the event just recorded, it became my duty to attend a man in Water street near Walnut. He was then in the seventh day of his disease, and during the three following days it exhibited the distinctly marked characters of yellow fever, to such a degree as to leave no doubt in the minds of the several physicians who from time to time came to see it—colour of the skin and eyes, singultus, vomiting of dark fluid, mixed with coffee ground particles. On the two days preceding his death he had repeated attacks of convulsions at intervals of nearly every four hours.

On examination after death, in the presence of eleven medical gentlemen, the following were the appearances: muscular system and adipose tissue full: dura and pia mater both tinged yellow, the vessels of the latter gorged; slight adhesion between the hemispheres; the ventricles contained a small quantity of yellow fluid. Much bloody serum issued from the spinal canal on removing the brain.

The trachea was covered with a brown mucus, which, when removed, exhibited the lining membrane of a dark mahogany colour, without any polish—an appearance like this ex-

tending down to the lungs. In the abdomen, the liver and intestinal canal were greatly altered; the former was of a pale yellow, firm and small. The cardiac region of the stomach varied in colour from a bright red to a livid. Its contents were a half pint of thick dark fluid, nearly homogeneous. The small intestines throughout were coated with a dark mucus, which when removed left to view a highly injected surface. The arch of the colon was of the same appearance.

The subject in question had been a shoemaker, twenty-three years of age, and addicted to the free use of ardent spirits.

Here, of course, by the received doctrines, we must regard miasm as the cause of the disease. About as satisfactory an explanation as to say that the first mentioned case was disease from an epidemical state of the air, or from endemic irritation.

Of Moisture.—Simple atmospheric moisture, without any great extreme of temperature, is not found to be productive of bad effects on a healthy subject conforming to the rules of hygiene. It gives, however, greater activity to the operation of both heat and cold; and is, when conjoined with either, a frequent cause of disease. Humidity acts on the skin by diminishing exhalation and absorption, and producing an atony of the extreme vessels. The circulation participates in this languor. The thirst is less, and the secretion of urine more abundant. Respiration is laborious; a kind of oppression is felt, owing probably to the watery vapour not being completely expelled from the lungs; the air which served for inhalation having been already charged with humidity. The secretion from the mucous membranes is usually augmented, hence a species of coryza and even diarrhœa. The senses are usually more obtuse in a humid air, owing to the undue moistening of their surfaces. Sensibility in general is blunted, muscular power diminished, and all the movements of the body slower and less agile.

TOURTELLE in his Hygiene, assures us that a humid state of the atmosphere is unfavourable to vegetable as well as animal life, and alters strangely the fluids and secretions. In a

wet spring the flowers of the yellow laurel rose, (*ægolethron*,) are poisonous, and the honey which the bees extract from them has similar noxious properties.

Moisture joined to cold constitutes one of the most efficient agents in the production of scurvy, scrofula, cynanche tonsillaris and trachealis, catarrhal fevers, and rheumatism. It is often the exciting cause of diarrhœa, dysentery, and tetanus, the more especially if there has been preceding great heat. In northern latitudes there is no condition of the air so invariably pernicious, so chilling and oppressive to the organs of respiration as the combination of frost with fog. It is this state, which has been found to accompany, if not produce, extensive influenzas and wide spreading pneumonic diseases.

In southern countries on the other hand, the union of heat and moisture may be viewed as exerting an influence paramount to that of all other causes, whether it be between decks of a ship, in close barracks, or in the lower parts of a city, and the swamps and low grounds in the country. This condition of the atmosphere acquires greater intensity of effect from the calms, or little circulation of air so often accompanying it. There is in fact a stagnant atmosphere which needs no miasmatic aid to give it destructive power. Moisture and cold, will, if ventilation be not attended to, produce scurvies on board a ship. Moisture and heat, with equal negligence in ventilation, will, in the same situation, be followed by remittent or gastric fevers. Let us transfer the question from sea to land. Along the shores of the Baltic scurvy is the chief endemic. Along the shores of the Mediterranean fevers are the regular diseases. If miasm be insisted on as the essential predisposing cause of the latter, why not dwell on the necessary agency of a like poison to the production of the former. We shall then have a febrific miasm and a scorbutic miasm.* And by a little extension, I was

* I was not aware, when I spoke thus of scurvy, that the spirit of generalization, had gone so far as to attribute it to the same common cause as intermittent fevers: but I now find, that Montfalcon in his *Histoire des Marais*, &c. has actually advanced this notion!

going to say perversion, of ingenuity, we may have an apoplectic miasm, and an arthritic miasm. This fictitious substantive may, in fine, be joined to as many appellatives as there are varieties of diseases, with the great advantage of easy parlance, and still easier thought, as no ideas can be affixed to such language.

Of Cold.—The effects of continued cold on the inhabitants of a country are well displayed in the Laplanders and Esquimaux. Their height is below the common standard; their organs are in a state of imperfection, similar to that of infancy; their external senses dull and sometimes obtuse. The operation of cold on the body generally is of a decidedly sedative nature, though when speaking of its morbid effects, we must generally hold in mind that these latter are compounded of the first application of cold, and secondary one of heat, and other stimuli. Still we are justifiable in speaking of cold as producing such and such effects, since it is the *causa sine qua non*. On the surface of the body, cold, in extreme, causes chops, chilblains, and even gangrene of the extremities—fingers, toes, ears, nose. When continued for a still longer period it strikes at the sources of vitality. The torpor of the capillaries represents that of the larger vessels, the heart and the brain. There is lethargy and apoplexy, particularly venous from the congestion of blood, and hence the great and at times irresistible propensity to sleep, in those who are exposed to great cold. We are not to conceive of a reflux of blood to the great cavities or the internal surfaces from cold outwardly applied. The torpor of the former immediately succeeds or is synchronous with that of the latter: and the reaction in both is simultaneous, or with little interval. The rest of torpor and the excitement of reaction may then be said to constitute this state of things. What is seen to take place in the skin is repeated in the other surfaces, mucous, serous, and synovial; and the alterations in the one will serve to give us an idea of the changes in the others, which cannot however, we know, be effected with equal impunity. The skin after exposure to intense cold, may speedily recover the rhythm of its functions: but not so with the internal sympa-

thizing membranes, lining or investing, which evince their disorder in catarrhs, pleurisies, rheumatisms, anginas, &c. The blush of the skin, heated after being immersed in cold water or long acted on by cold air, is often no more than sensation. The same blush in the parts already specified is irritation and pain, productive of fever.

Habit will reconcile the system to extreme cold, and even to certain alternations: but unaccustomed exposure, as in the case of the inhabitants of warm climates, during a northern winter; or in temperate climates, the prolongation and unusual severity of this season, and the habit weakened by prior disease or old age, place persons in the situation most liable to suffer from it. The appalling examples of the physical and moral influence of cold in the disastrous retreat of the French army from Russia, are too recent and too generally known to require particularizing here. It is not perhaps as generally understood, that the loss of the Russians was not much inferior during their advance. Observe now the power of theory over the explanations of the phenomena of disease. In Egypt it was not thought possible for a few thousand French and English soldiers to die without the aid of miasm or contagion, or both, while in Russia, hundreds of thousands of French and Russians were allowed to make their final exit in every variety of torment, by the common place agencies of cold and starvation.

In England and France it has been remarked, that the very cold winters have been the most productive of disease. BLANE, HEBERDEN, and BATEMAN, among others, have, in opposition to the vulgar idea of the salutary nature of cold, and the comparative health in winter, exhibited the number, complication, and violence of epidemics in this season. Records of similar visitations in these United States are by no means unfrequent, whether we call them putrid sore throats, spotted fever, cold plague, typhus pleurisy, pneumonia typhoides, or influenza.

Those who think to draw a distinction between fevers, the alleged product of miasm, and the phlegmasiæ resulting from acknowledged atmospherical vicissitudes, in the state of the

digestive system and appearance of the tongue, as indicative of the former, will be egregiously deceived in their prognosis. Autumnal fevers will in their decline be often associated with pulmonic disorder, in consequence, as we are sagely told, of the miasm or endemic irritation directing its force to the pleura and lungs in place of the stomach and liver. Winter fevers, the influenza for example, will begin its attack like catarrhal or pleuritic fever, and in its course attack the chylòpoetic viscera. During the last winter I have seen the disease travel from the head and breast, when it showed itself as coryza and catarrh, to the stomach, causing vomiting, and the intestines producing dysentery. Authorities might, if necessary, be largely furnished to corroborate this view.

Of Winds.—Though a wind blowing from a particular quarter, or one suddenly succeeding another, seems often to have no effect distinguishable from that which may be explained by the accompanying temperature, or its sudden change; yet at other times, unquestionably, there is something inherent in the wind itself, which exerts a powerful impression on the animal frame.

In the northern hemisphere, we are much more sensible to the same thermometrical measure of cold when a northerly wind blows, rather than when it is calm; and during the prevalence of a southerly wind, that heat, otherwise tolerable, becomes oppressive. In a given temperature our feelings are widely different when we are fanned by a westerly, and blown on by an easterly wind. Nor can this difference be accounted for from the operation of local causes, as the intervention of land or water. An east wind, says Bateman,* with the thermometer at 50°, F. will impress the body with a more chilling effect than a south-west wind, when that instrument indicates a temperature ten degrees lower. The Edinburgh Reviewers might, perhaps, explain this fact, on the supposition of the east wind being the bearer of miasmata from Holland to London, across the German Ocean. Let not the serious reader accuse me of undue exaggeration of the extrava-

* On the Diseases of London.

gance of the miasmatic theory, by feigning for a moment its advocates to entertain such phantasies. This very notion of the migratory tendency of marsh air is gravely advanced in the forty-fifth number of the Edinburgh Review. We must do the writer the justice of acknowledging, that he is not always prone to give his favourite such ærial journeys, for in the same article, he describes, with becoming minuteness, its creeping progress along the parks, and through streets in the west end of London. Wo be to you, ye votaries of fashion, who resort thither to display your fine equipages, fine dresses, graceful airs, and pretty faces. Worse than the cup of Circe is presented to you in the subtle miasm, which moves along with your chariots in Hyde Park, and follows in your train in Bond street. Little do you dream of your danger, or imagine that, while you are swallowing a compliment or a jelly, you are at the same time receiving a dose of this poison. Scornful persons and sneerers ought to be particularly careful how they indulge their propensities, since upturned noses offer a fair passage to this insidious miasm, which, if it cannot travel downwards to the stomach, flies up incontinently to the brain, producing phrenitis or apoplexy.

Fond as the North American Review is of echoing the opinions of its trans-atlantic compeer, I am afraid it will hardly venture on the experiment of conducting the miasm across the ocean, and make it the cause of the rigors, chills, rheumatisms, hæmoptyses, and fevers, not to mention the dyspeptic band, of all which the easterly wind is, in this country, a munificent supporter. We are usually taught that the penetrating chillness and cold, of which this wind is the bearer, arise from its blowing off the ocean; but unluckily for this easy and conversational explanation, the finest weather in Great Britain, during the summer months, is when the south-west wind prevails; that, be it remembered, which blows from this same ocean, the alleged origin of the malignity of the easterly. Need we mention, that the wind most pure and invigorating to us on this continent is the westerly or land wind. Now comparing the Atlantic ocean to one vast morass, and supposing all to the eastward of it *terra incog-*

nita, we should, by the received theory, most strenuously argue that all the disorders above mentioned were produced or kept up, not by the wind sweeping over it, but by the miasm arising from it, and of which the wind was the conductor. Who does not see that many of the histories of reputed miasmatic diseases rest on no better foundation than is furnished in this suppositious case. Take the following as an instance of the remarkably different effects of two winds, without miasmatic aid having been invoked for either. In the account of the influenza, which prevailed in England in 1803, by Dr. CARRICK, we learn that the inhabitants of that side of Richmond terrace on Clifton Hill, near Bath, which fronted the east, were universally attacked with the disease, while on the south side, the great majority both of persons and families, in all other respects similarly circumstanced, escaped it entirely. When BACON repeated the proverb of the east wind being good for neither man nor beast, and the school of PARACELSUS, in giving niches to the north, south, and west winds, in the temple of Juno, or the air, denied one to the east, they were not aware that the source of its mischievous tendencies was miasm from marshes, low grounds, or all grounds over which it might blow. The notion would have chimed in well with the extravagant genius of Paracelsus. Bacon might have very provokingly asked for proofs; unless, indeed, he had put it on the same footing as judicial astrology, in which we are told he suffered his great mind to believe.

The noxious effects of an easterly wind would seem to be alike potent, whether heat or cold be associated with it. Of its having been regarded as one of the main predisposing causes of the Gibraltar and some other Spanish epidemics, I have already spoken. Lind's remarks on its influence in England are not less expressive. "An east wind," says he, "is usually accompanied by a cold, damp, and unwholesome vapour, which is observed to affect both animal and vegetable health, and in many places to give rise and obstinacy to intermitting fevers, as also to produce frequent relapses." In eastern China, the north-east monsoon induces all the un-

pleasant feelings that distinguish it in our own country; and it has the same property of bringing on attacks of intermittent fever which distinguish it in England. When a convalescent from this disease in Macao, I was immediately sensible of a change of wind from the south-west to the south-east, though I was in the house, and the thermometer was not then affected.

The *south wind* displays features not less characteristic than the one just treated of. It is the associate of a moist and rarefied atmosphere, and has a singularly relaxing and enervating effect. It so generally brings rain, and the north clear weather, that the poets when they describe the deluge, feign the latter to have been at that time imprisoned, and the former sent out with a very extensive commission.

The south wind is emphatically the companion of pestilence, whether it be the semoom or samiel of the desert, sweeping across Egypt, like the destroying angel, or the milder austral breeze, striking on the coasts of Attica, and bearing, as Thucydides thought, the seeds of the plague, which ravaged Athens in the Peloponnesian war; or that sung by the Mantuan bard, in the *Georgics*, lib. i. l. 444.

Arboribusque satisque, Notus pecorique sinister.

Or more celebrated in Homeric verse, when,

—— Vapours blown by Auster's sultry breath
Pregnant with plague, and shedding seeds of death,
 Beneath the rage of burning Sirius rise,
 Choke the parched earth and blacken all the skies.

CELSUS, in giving advice for the preservation of health, during the prevalence of pestilential diseases, insists particularly on its observance, when they are excited by a southern wind. Great stress is laid by VITRUVIUS on the situation of cities and houses, in reference to their exposure to particular winds. In speaking of Mitylene, he tells us that when the south wind blows, men become sick; when the north-west, they cough; when the north prevails, they are restored to health. Would this account be any more lucid, or applicable to the preservation of health, if Vitruvius, with something like

Egyptian mysticism, had told us that people became sick when the south wind blew, because it carried miasm, or that they coughed because the north-west wind had in it a pneumonic principle. I doubt whether a modern miasmatic commentator could add an iota to elucidate the plain aphorism of Bacon, *Flante Austro, pestilentes morbos grassari*.

In this western hemisphere, the southerly wind will be found to bear the same character as in the old world. I have already quoted Dr. LEFORT's opinion on the subject of its producing and keeping up the yellow fever. They who have read some of the many accounts of the sirocco wind in the Mediterranean, have been taught to believe that its peculiar effects arise from its blowing first over the African desert, and holding a certain portion of sandy or other particles in a kind of suspension. But in the West Indies, on the testimony of the author just mentioned, we learn that the sirocco is not the wind of the desert, but the south wind, whether from land or ocean. "This action of the southerly winds," says Lefort, "was sensibly felt by all animated nature in those islands, and produced indefinable effects on the senses: it was felt by the man in his bed, or seated at his desk: it oppressed, prostrated, and urged to the darkest melancholy."

North wind. Under this head I include those winds which blow from the north-west to the north-east; dry, clear, cold and invigorating from the former quarter; hazy, cold, and penetrating from the latter.

Celsus, echoing the language of Hippocrates, considers the north wind as exciting cough, irritating the fauces, constipating the bowels, and inducing difficult urination and pain in the side and breast, with shivering. In fact, anginas, catarrhs, rheumatisms, pneumonic and pleuritic affections, are the legitimate products of the winter season, and long continued northerly winds. When these alternate with moisture and occasional southern blasts, the thoracic affections become complicated with abdominal ones, and we have fevers of various kinds. The thermometer low and barometer high, indicate a state of atmosphere favourable to the production of inflammatory disease; while the barometer low and thermometer high,

augur complicated fevers. In the first case the north, in the second the south, will be the prevailing winds. The former will be most dreaded by the person with weak chest—the latter will be feared by the invalid from remittent and intermittent fevers.

A vast region is occasionally so divided as to present these two exposures and corresponding climates, and physical and moral peculiarities and diseases of the people. Thus, Asia is divided by the Himalaya range of mountains, into northern and southern. The one exhibits its many bleak steppes and vast plains of Thibet and Tartary, inclining towards the river Oby and the Frozen Ocean, and constantly exposed to the piercing northern blast. The other, opening south into the fertile valleys of Hindostan, exhibits a gradual decline, ending at the Indian Ocean. What is here seen on a grand scale, and marked by corresponding magnitude of effects, may, in a minor degree, be pointed out in every country, where a range of hills extending east and west, have a gradual declination to the north on one side, and to the south on the other. Montpellier, so long and so unmeritedly praised as a fit residence for the consumptive, presents this peculiarity, and so well aware are the physicians and inhabitants of the difference in exposures, that it is on the southern side alone, that the invalid is permitted to promenade; and when the health is in danger, a house is selected sheltered from the keen northern blast.

The *mistral*, or north-west wind, and the *beeze*, or north-east, are those from which persons suffering with weak chests, and liable to phthisis, desire most to be protected, and the promised exemption in this particular, is what induces so many English and other foreigners to resort to Nice, Villa Franca, and Hieres, on the coast of Provence. Not more certainly will they be attacked by intermittent fevers, who are exposed to a southern wind, sweeping over low and marshy grounds, than those, constituted as above mentioned, will sink under phthisis pulmonalis, by inhaling a bleak northerly wind sweeping from the distant hills and mountains. This is well illustrated in the climate of Hieres near Toulon. The ground between the

town and the sea to the south-east, is mostly marshy, and not unfrequently gives rise to remitting fevers among the inhabitants during the summer; while that part of it exposed to the north-west, especially in winter, renders the residents liable to pulmonary consumption. If a miasm, borne on the south-east wind, be the cause of fever in the summer, why ought we not to invoke the necessity of some deleterious principle, or miasm conducted by the north-west wind, as the cause of phthisis. But if the sensible qualities of the air be admitted as adequate to produce or keep up one disease, I cannot see why they may not be equally operative on the other. When HUXHAM tells us he has seen an epidemical catarrhal fever assume the nature of a pleuro-peripneumonia in bleak and elevated situations, whilst in lower ones it approached nearly to the nature of a slow, or so called *nervous* fever,* he very explicitly points out the influence of localities and exposures, without the unphilosophical intervention of miasma, which the modern school would conceive necessary to explain the difference of the diseases above mentioned. He very properly adds, that the reason is hence seen, why, in the same reigning disease, a different method of treatment is lauded in different places. A variable season will, on this principle, by representing as it were various situations, give us both phlegmasiæ of the thoracic cavity and intermittent fevers. Sometimes, says the author already cited, a quotidian, a semi-tertian and tertian fever, will prevail epidemically at one and the same time, with pleurisy and peripneumony—as happened in the early part, (March, April, and May,) of the year 1744. Authorities to this effect might be multiplied without end, but the reader, desirous of a brief, lucid, and impartial history of all the circumstances in situation, as regards exposure to particular winds, and their succession and alternation, as well as the influence of the seasons, ought to consult the great father of our art, the *principium et fons*, in

* Quid quod et interdum vidi febrem catarrhalem epidemicam, pleuro-peripneumoniam naturam induisse per loca montosa et algida, dum in humilioribus ad lentam proximam, (seu nervosam ut dicitur,) febrem accessit. Prefat. p. 185-6. Opera Physico-Medica.

his works, *De Aqua, Aere et Locis*; *De Diæta*, and *De Epidemiis*, and also his *Aphorisms*.

Noxious as are, however, the effects of certain winds and their alternations, we have still more to fear from a stagnant atmosphere. "It is probable too, says Ferguson, that the healthiness of seasons in unhealthy climates depends less on the *amount* of heat and moisture than on the ventilation of the climate by powerful regular trade winds, like the trade winds between the tropics; for whenever these have been withheld for a time, the accumulated morbidic emanations from underground moisture will act upon the human body like the accumulated typhoid principles in crowded hospitals, when undiluted with a due proportion of atmospheric air." The pernicious consequences of a dry summer in the West Indies, are perhaps, mainly referable to the accompanying stationary atmosphere. The fact itself is so generally admitted as to require no additional enforcement here, but the explanation of Dr. Ferguson is manifestly speculative. Blind to, or wilfully overlooking the evident condition of the air, physicians constantly seek for some unknown, unappreciable, and we may add, monstrous principle, which, as it has no fixed origin, cannot be subjected to rigorous laws, but may be pressed into the support of every hypothesis. When those unhappy creatures, pent up during a night in the Black Hole at Calcutta, perished in such numbers before morning, was it by the effluvia from under ground moisture, or by any effluvia from the ground whatever? When the hatches of a ship are shut down for a few days in bad weather, and there are many people breathing between decks, is it from such effluvia or miasmata that the consequent typhus originates? These may, perhaps, be called extreme cases. What then shall we say of *cholera infantum*, so fatal to children in the hot, stagnant atmosphere of a city, and in parts of it where no miasma can be or is suspected? That it proceeds from the irritations of close heat, teething, and crude or improper ingesta. When this disease prevails, as it occasionally does in parts of the country, as in the Miami district of Ohio, according to Dr. DRAKE, is it then the result of miasm from marshes, or effluvia from underground moisture?

Thirty or forty children have died in a week in this city from cholera, who have exhibited by the symptoms in life, and appearances after death, extensive structural alteration in the stomach, intestines, and brain; yet in their case we hear little if any thing of miasma. But let two or three adults die in the lower part of the city of yellow fever, and the changes are rung upon the words importation and contagion—or miasm. I do not well see by what scale of moral law we can feel less sorrow or alarm at the death of thirty children, some of them their parents sole hope of present peace and after joy, than at the death of three or four drunkards; or by what philosophy we admit evident natural agents and processes, as sufficient causes of disease in the former, and require an unknown, unappreciable additional cause in the malady of the latter.

A very brief study of the influence of temperature on the human frame will soon convince us, that heat in summer and cold in winter, are respectively the predisposing or exciting causes, (according to the condition of the individual at the time,) of the epidemics of those seasons. If in spring and autumn diseases are more numerous and complicated, the reason is to be sought in the extreme states of the atmosphere, as heat and cold, moisture and dryness, northerly and southerly winds rapidly alternating with each other. The noon day sun is that of summer—the midnight cold is that of winter. The climates called temperate, which are so noted for the vicissitudes of weather, have, from this cause been the greatest sufferers by epidemics. “The great sickness, says Pringle, in his work on the Diseases of the Army, commonly begins about the middle or end of August, whilst the days are still hot, but the nights cool and damp, with fogs and dews; then, if not sooner, the dysentery prevails, and though its violence abates by the beginning of October, yet the remitting fever gaining ground, continues throughout the rest of the campaign and never entirely ceases, even in quarters, till the frosts begin.” p. 104. HOME, in his Dissertation on the Remittent Fever of Flanders, makes similar observations on the extremes of temperatures, and of dryness and moisture. The subsidence of the more simple, though often

violent diseases of summer, is but the prelude to those more complex ones of autumn. "About the time when the tertians begin, the cholera morbus, rash, and *essere* become frequent and epidemical in a less degree, but are seldom met with after September, while the tertians continue till winter."^{*} Corroborating what had been advanced by this writer under the same head of the Rise Declension, &c. of Epidemical Diseases for the year 1744, viz. "As the summer and autumnal weather of one year never varies much from that of another, so the same tribes of distempers return regularly with the seasons, and succeed each other in the following order."

In Malta, in 1813, the difference of temperature between day and night was sometimes from fifteen to eighteen degrees, and was the greatest during the most fatal period of the pestilence; and we learn from respectable authority, (Dr. WYTHE,) that plague has been ever most prevalent where the difference between noon and midnight temperature has been greatest, and at the seasons of sudden change from dry to moist, and from warm to cold. In no country is there, at some seasons, a greater difference between the temperature of day and night than in Egypt, where the days, at times insufferably hot, are succeeded by nights so extremely cold, that three, sometimes four blankets, are required by a person to keep himself warm.

Night, we are told by the miasmatists, is the time when there is the greatest precipitation of marsh effluvia, and consequently the period during which residents in sickly countries are in the greatest danger of being attacked by fever. The fact of danger during the night is unquestionable, the miasmatic explanation purely speculative. "At the hottest time of the day, the air of the marshes is clear, serene, without smell, it may be breathed without danger; *it is, however, then that the exhalation of marshy effluvia goes on with the greatest activity.*"[†] How is this? At the very time when the pestiferous effluvia are given out with the most activity we can then inhale them with the greatest security!

* Cleghorn, Diseases of Minorca.

† Montfalcon, p. 89, 90.

The explanation furnished of this paradox, is that the miasmata are volatilized with the aqueous vapour in which they are suspended. But moisture is not required, according to Dr. Ferguson and others, for the evolution or suspension of the malaria. We will, however, suppose it thus volatilized, and harmless during the day, when it is given out in the largest quantity. At night it descends, we are told, with the dews, or according to others it descends from the atmosphere and ascends from the ground at the same time. The noxious emanations are then approximated, says LANCISI, in consequence of the diminished temperature, and act of course on the persons exposed to them with increased energy. Let us ask, whether this condensation or approximation of miasmatic particles makes them more powerful, now that the supply from the earth is much less than it was during the day; and whether sublimation and greater evolution ought not to be equivalent to condensation and minor evolution.

An inquiry into the actual and perceptible atmospherical changes after the decline of the sun below the horizon, will show how far they will go to explain the attacks of disease during the night.

At variance with pre-conceived opinions, is the now well established fact, that dew is only in a small proportion the product of vapour rising from the earth at night, but is rather the result of the precipitation of moisture from the air, on its meeting the colder substances on the surface of the earth, or within a few feet of it. This coldness depends on the radiation of heat by the earth during the night in return for the heat radiated to it by the sun during the day, and which, if suffered to accumulate, would destroy the present constitution of our globe. The surface of the earth thus rendered colder than the neighbouring air, condenses a part of the watery vapour of the atmosphere into dew. This condensation is, of course most perceptible on those bodies which soonest become cold by the radiation of their heat. For this reason we find that the quantity of dew on grass is much greater than on gravel-walk or garden mould, the former being often ten or twelve degrees of Fahrenheit colder than the latter. *The*

Fluid then of dew appears chiefly where it is most wanted, on herbage and low plants, avoiding in a great measure, rocks, bare earth, and considerable masses of water. Bright metals exposed to a clear sky in a calm night will be less dewed on their upper surface than other solid bodies, since they lose the smallest quantity of heat by radiation to the heavens.

In corroboration of this theory of dew, we learn that in Egypt a little before the rising of the Nile, and consequently when the ground there is in its driest state, dew becomes exceedingly plentiful, though little or none had formed before, when the earth was somewhat less dry. A parcel of wool on a board, raised a few feet from the ground, acquires more dew than wool upon a grass-plot. Lastly, if dew were the vapours from the earth it should never appear in any considerable quantity without being accompanied with fog or mist; now it has been found that the formation of the most abundant dew is consistent with a pellucid state of the atmosphere; and in Egypt, according to HASSELQUIST, during the season remarkable for the most profuse dews, the nights are as resplendent with stars, in the midst of summer, as the lightest and clearest winter nights in the north.

From these facts we learn how the inhabitants of certain hot countries, who sleep at night on the tops of their houses, are cooled during this exposure, by the radiation of their heat to the sky. We also explain the greater chill which we often experience upon passing at night from the cover of a house into the open air, than might have been expected from the cold of the external atmosphere. On a clear night in an open part of the country, nothing, almost, can be returned from above in place of the heat which we radiate upwards. In towns, however, some compensation will be afforded, even on the clearest nights, for the heat which we lose in the open air, by that which is radiated to us from the surrounding buildings.

Bodies may be protected from dew by a canopy of matting or sail-cloth, even though the sides be entirely open, and a free passage of air admitted under it. Any kind

of cloth, even placed perpendicularly to the earth will afford protection from dew, by preventing, in part, the loss of heat by radiation.

Though dew, conformable to the principles here laid down, can never be formed in temperate climates upon the naked parts of a living and healthy human body during night, yet in very hot countries its uncovered parts may sometimes, from being considerably colder than the air, condense the watery vapour of the atmosphere, and hence be covered with a real dew, even in the day time.*

We may from the above, account for most of the noxious effects of exposure to night air. The fatigues of the day place the body in a state peculiarly liable to be affected by any unusual impression, whether of atmospherical vicissitudes, or of ingesta, or the passions. In the case of persons sleeping exposed to the night air, we have a reduction of temperature of many degrees; continued loss of heat by radiation from their bodies, and the sudden application of humidity to a skin strongly excited by the sun during the day, and partially exhausted in function by prior profuse perspiration. The conditions for a great formation of dew and precipitation of moisture will be the prior evaporation from masses of water, and the adjoining earth in such a state as to radiate freely its caloric, and be much colder than the superincumbent air. Now, we know, that both these conditions are united in marshy districts, and, of course, in them have we to apprehend the worst effects of humidity. But dew is not, as we have seen, the product of air in the neighbourhood of marshes alone. It will fall heavy where vegetation is abundant, and may be seen on hills as well as on low grounds. Exposure to it and the colder night air, will in the spring produce pleurisies and rheumatisms; in the summer cholera and diarrhœa; in the autumn dysentery and periodical fevers. Disease will display itself according to the order of parts which were rendered susceptible by the pre-existing season or atmospherical constitution. Thus, ophthalmia will be com-

* For further particulars the reader is referred to Wells on Dew.

mon in Syria and Egypt, with those who sleep on the house tops exposed to the night air and dews. The great heat and light of the day, increased by the reflection from the sand and rocks, had made in those persons the eyes their most irritable part, and, of course, that which will first suffer by any succeeding agent suddenly applied to the body. Soldiers on a campaign, and similarly exposed to night air, after a long and fatiguing march, will have some dysentery, others fever, according to the previous state of their intestinal canal, arising out of individual peculiarities, or the use of crude ingesta.

In low marshy districts, impure water and solid food of an imperfectly nutritive nature, are to the full as contributing causes of fever and disease as the alleged miasm.* In fact, if we attend to diet, clothing, and protection from certain winds and atmospherical vicissitudes, this last, so much dreaded agent, is reduced to a cypher, a mere negation. The person who would wish to escape periodical fever, need not suffer his mind to be haunted with the idea of a pervading poison, but may confidently abide by those rules and precautions which he would adopt if he wished to escape any epidemical disease.

If the air of marshy countries were not merely a cause among others of sickness, but the cause, as the miasmatisists teach us, is it not inconceivable, that there should be so great a difference in the inhabitants of such districts as regards their exemption from fevers when all are necessarily obliged to inhale it? And yet we know, that in Zealand itself, "such as live well, drink wine, have warm clothing, and good lodgings, do not suffer so much during the sickly season as the poor people."† I have myself been told by a French officer, who served in that country, that, if common prudence were used, and wholesome drink taken, he and his companions had little fear of fever.

The capital error of the miasmatisists, whether of the Cullenian school, or the associates of Bancroft and of Armstrong, consists in predicating on any particular cause, the course and

* See Hippocrates *de Aqua*, &c.

† Doctor Wind, quoted by Lind.

symptoms of a malady. It has been strangely forgotten, that various causes, insolation, a blow on the head, a sudden gust of passion, for example, will produce frequently similar effects; that the stomach and digestive system may be disordered by a general impression on the skin, as in the sudden obstruction of perspiration; by a chronic irritation of this same part; by irritation of other parts, not less than by direct irritation of the stomach itself. Nothing could be more fallacious than the reasoning of Armstrong, that, because in typhus there was in degree the same diseased alteration of the mucous surfaces of the intestinal canal and pulmonary apparatus, and of the brain, as in remittent fever, that therefore typhus was, like this latter, the product of miasm.

The disease called softening of the brain, and which acknowledges a variety of causes, not unfrequently exhibits towards its close, all the symptoms of typhus fever. The thirst is commonly increased; appetite lost; lips and teeth dry; tongue rugous and chapt, at first red and afterwards brownish or blackish. Deglutition is often difficult, almost impracticable; the efforts at the act sometimes convulsive. In some cases copious vomiting, first of food, subsequently of bile; frequently great abdominal tenderness, sometimes involuntary discharge of fæces, more frequently constipation; unconscious escape of urine; respiration often tight. The pulse is in some instances accelerated and stronger than ordinary.* Could the respective advocates of miasm and contagion in typhus draw a stronger picture than the above, to enforce their opinion of a poison having been applied to or taken into the body.

In conclusion, I think we are justifiable in the present stage of this inquiry, in denying the existence of any such separate, peculiar, or specific morbid cause, as miasm or malaria. The attempts to explain its origin and production are so far entirely unsuccessful, and involve those who persevere in them in a tissue of contradictions, which would not be advanced or received by any known laws of evidence.

* See the works of *Lallemand* and *Rostan*, "*Sur le Ramollissement du Cerveau.*"

The argument in favour of miasm, drawn from the periodical character of fevers, which are its alleged product, has no better foundation in fact, since periodicity is common in degree to all diseases, and in a marked manner to many which were never thought of miasmatic origin.*

The seasons when intermittent and remittent fevers most prevail, is that in which all the evident causes of disease most abound, and when many are exasperated or return, which acknowledge no paludal origin.

The recurrence of intermittent fever in the spring, in those who have suffered from it in the preceding autumn, cannot be accounted for by any miasmatic theory, and is after all no more surprizing than the recurrence of gout, hæmoptysis, and rheumatism.

That a residence in marshy countries subjects to intermittent fever, is an undeniable fact—and that they who live on broken hilly districts are liable to pulmonary diseases, is also unquestionable. If locality explain the latter, it may equally explain the former, without recurrence to imaginary agencies. In the same county of Lincoln, in England, the inhabitants of the fens are sufferers from intermittent fevers; those of the wolds or hills, are obnoxious to catarrhs, pleurisies, and phthisis. If an exchange be made of habitation in these two cases, there will be an exchange of diseases. Why then demand miasm as a cause of the fever, and refuse it as a cause of the pulmonary disorders?

The winter season, by placing the inhabitants of the low grounds under the influence of its atmospherical constitution, will cause catarrhs, pleurisy, &c. The autumn, if very wet, may make the tenants of the hills and mountains liable to intermittent fevers. In season and situation then, as subjecting a country to atmospherical extremes and vicissitudes, and in impure drink and crude indigestible food, we may find the causes of epidemical diseases, as has been done by Hippocrates, Sydenham, Huxham, and Cleghorn, to the rejection of the misleading unit cause, miasm.

* See my Essay on Periodicity and Lunar Influence in the last number of this Journal.

[I received the following letter from Dr. Holcombe, very soon after it was written; it was accompanied with a request, that I would, in some way or other, give my opinion upon its several subjects. I found it so interesting, and so practically important, as to determine me to give it publicity in this number of the Journal. In doing this, I hope I shall not be considered as manifesting an overweening self-love, by not expunging the kind, or rather flattering, mention made of myself. I would *most gladly* have done this, had it been practicable, without injury to the other parts of the letter.

WILLIAM P. DEWEES.]

ART. VIII. *Letter from Dr. GEORGE HOLCOMBE, of Allentown, N. J. to W. P. Dewees, M. D.*

Allentown, N. J. Nov. 21, 1825.

DEAR SIR—I have just finished reading your System of Midwifery, and have to request you to accept my thanks, in common with the profession, for the much novel and valuable information which it contains.

Permit me to call your attention, for a few moments, to several subjects, which have been but briefly noticed in your work. The first is Ergot. This extraordinary agent owes its introduction into the *Materia Medica* entirely to American physicians; and, as yours is the first System of Midwifery which has issued from an American source, since its use has become general, the profession, both here and abroad, looked to your pages for a more particular account of the properties and uses of ergot than has heretofore been given. I am afraid they will be much disappointed, as I frankly declare to you I have been, in finding it passed by almost unnoticed. Much, it is true, has already been written concerning it; and, I am aware, that practitioners are supposed to be well informed as to its properties, and the cautions necessary to be observed in its administration. But this I am persuaded is a mistake—and, in my opinion, you could not more effi-

ciently subserve the cause of humanity and obstetrics, than by devoting a chapter, in the second edition of your work, to the consideration of the uses and abuses of this article.*

The scruple dose, as a general prescription for aiding the expulsive stage of labour, I am convinced, from considerable experience, is exceptionable and dangerous. In ordinary cases, no mischief, it is acknowledged, will result from the exhibition of so large a dose. But the child, if it be unusually large, or the pelvis faulty, or if the accoucheur have to contend with a first labour, will always be put to imminent danger, and frequently destroyed by scruple doses, when its safe delivery might have been effected, either by the unassisted energies of the mother, or by small divisions of the dose, frequently repeated.

Your zeal in proscribing the use of the crotchet, will doubtless obtain, as it certainly merits the plaudits of your brethren—at least of the more enlightened portion of them. But if the use of the terrible instrument just named be as reprehensible, (and who will presume to deny it?) as you have represented it, how much less so, or rather how much more so, is the intemperate use of an agent which sacrifices a four-fold, if not a twenty-fold, greater number of victims? More children, I am satisfied from what I have seen and heard, have already perished by the injudicious use of ergot, during the few years which have followed its introduction into the practice of this country, than have been sacrificed by the unwarrantable use of the crotchet for a century past! This, if correct, is a most serious fact; and of its truth I do not entertain the slightest doubt.†

* In my "Essay on the means of lessening pain," &c. I have given the history of the "use of the Ergot;" I did not think it necessary to repeat what had already been said; especially as we are constantly receiving some practical hint, besides regular histories of this article through the medium of the different Journals published in this country.

† I rarely employ the "ergot" in any dose; and were I to establish a proportion between the cases in which I do employ it and those in which I do not, I would at a venture say, not more than one in seventy-five or eighty cases. When I do use it, it is in scruple doses—that is, I give this

But notwithstanding the strong language I have just used, I regard ergot, when cautiously administered, as a most interesting and valuable adjuvant in the practice of midwifery. I have used it constantly, since Dr. STEARNS first called the attention of physicians to it. For some time I used the scruple doses, or corresponding doses of the decoction, which I am afraid, are every where yet too common, but soon abandoned this practice in consequence of several fatal demonstrations of its impropriety. Since then I have administered it in very small doses—say from two to three grains, which I

quantity, and if it fail to produce its full effect in fifteen or twenty minutes, I give a second dose, should this fail I urge it no further.

I never exhibit this remedy, but after the rupture of the membranes; the full dilatation of the os uteri, and a disposition in the external parts to relax. When given under such restrictions, I am disposed to believe no injury can arise from its use, at least I have never seen an instance of a still birth, which could be attributed to the action of this medicine. This result comports with the experience of the friends I have consulted upon this subject; among those I may mention Drs. James and Chapman.

I must not, however, be understood to deny, that mischief has arisen from the use of this drug: for, I believe, much has followed its incautious use. I am disposed, nevertheless, to think, that the evils complained of from this cause, have arisen from its having been administered at improper times, rather than from improper quantities. This belief is founded upon the certain knowledge of its having been used, before the conditions proper for its employment were present. I have known it given before the rupture of the membranes, the dilatation of the os uteri, or a disposition in the perinæum to relax.

It is noways difficult to account for still-born children, under such circumstances, especially where a rigid perinæum is to be contended with, as but too frequently happens with first labours. For the action of the “ergot” is very decidedly such, as to produce a most powerful state of tonic contraction of the uterus, as well as to augment the alternate.

In consequence of this, the placenta becomes strongly compressed between the child and the uterine parietes; its vessels will, therefore, be more or less obliterated, and the circulation between the mother and child so retarded, as to interrupt the due oxygenation of the blood: the child will of course die, because it receives little else than black blood.

I think it an error, to suppose that the “ergot” has any direct injurious agency upon the child; when it does mischief, it is by an indirect action.

repeat as often as may be necessary: and in this manner I am *generally* able to effect my object; and *always* without injury to the mother or child. In fact, I have never known a child's perishing from ergot, administered in this cautious manner.* I prescribe it now unhesitatingly in first labours, and even in cases of contracted pelvis: and such is the extraordinary energy imparted to the uterus, by the slow but persevering mode of exhibition which I have adopted, that I have very rarely found it necessary, for several years past, to resort to the use of the forceps.

Independently of the power of ergot in aiding the expulsion of the child, it seems to possess other important properties in the practice of midwifery. I have never seen a case

* It is highly useful to be informed, that small doses of the ergot, are equally efficacious with large, as regard the main object of its exhibition; and the more especially, as Dr. Holcombe assures us he has never known either the mother or child to sustain any injury from this mode of employing it. Of the efficacy of this plan I can say nothing from my own experience; though resolved to put it in practice in the first case in which it may be proper to employ it. But the character of Dr. Holcombe is every way sufficient, in my mind, for the profession to place the fullest confidence in his experience.

It would seem, however, that much must depend upon the condition of the uterus and perinæum at the time of its exhibition; since, the same results have followed the use of the larger as of the smaller doses, agreeably to the experience of Drs. James, Chapman, and myself. Now, as it is certain, that in the practice of the gentlemen just named, the "ergot" was not given but under the proper conditions for its exhibition, it seems to follow, that much more is attributable to the time at which it is exhibited, than to the quantity given.

Dr. Holcombe assures us, that he gives doses of but "two or three grains, and repeats them as often as may be necessary." I regret he has not been a little more explicit upon this point, by informing us at what intervals, or what constitutes the necessity for repetition. I should, however, conclude, that he has been governed in the use of his small doses, by the same rules, as influence other practitioners in the employment of the larger doses, namely, a failure in efficacy; and the interval may be every fifteen or twenty minutes.

It may be oftentimes of great practical value to know, that by repeating small doses of the "ergot," we may gradually urge the uterus to efficient action; for sometimes, without doubt, it is urged beyond the necessary degree.